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ABSTRACT

An evaluation was conducted of an Illinois Department of Curriculum and Instruction inservice course on microcomputer utilization. Designed to provide educators with preliminary knowledge and experience pertaining to educational uses of microcomputers, the course focused on hardware, software, philosophy, methodology, utilization modes and patterns, and related literature. A post-test was administered to 115 teachers in 8 classes to evaluate the following areas: computer literacy and skills; educational hardware and software evaluation; program development and writing; effectiveness of the course in teaching computer skills; and the course structure, organization, content, and relevance. Findings showed that the participants were generally satisfied with the course effectiveness, organization, content, and relevancy, although those who had future plans to utilize microcomputers were more satisfied than those with no such plans. Responses were significantly influenced by teachers' goals and suggest that most teachers are not prepared to use computers independently after one microcomputer course, and that they need to obtain a certain level of hands-on computer familiarity and competency before they can use the computer competently in the classroom. (LMM)

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INSERVICE MICROCOMPUTER TRAINING: AN EVALUATION

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BACKGROUND

Education is rapidly emerging as one of the most important areas of applications for microcomputers. Microcomputer utilization can serve as a modern, cost-effective approach to many of the day to day functions of a school or school district. The microcomputer can be a motivating teaching aid, an efficient administrative or secretarial aid, and a valuable tool for all who are involved in the learning environment. The microcomputer can teach, be taught, or provide services. It will, eventually, replace typewriters - but not secretaries, account books - but not accountants, and textbooks - but not teachers. Many schools find themselves at a crucial point in the decision to bring computers to the classroom. One of the hindering factors is the lack of trained personnel (administrators and teachers) to implement and teach students how to use microcomputers and the related software. A number of Chicago and Illinois suburban schools have purchased microcomputer equipment, but do not have qualified teachers to teach the courses. To meet this need the Department of Curriculum and Instruction developed "Microcomputer in Education", C & I 342.

"Microcomputers in Education" provides teachers, administrators and other educators with preliminary knowledge and experience pertaining to educational uses of microcomputers. Focus on hardware, software, philosophy, methodology, utilization modes and patterns, and related literature. The course included hands-on experience with microcomputers. The objectives of the course:

a) To provide teachers and administrators with decision making capabilities regarding educational microcomputer utilization.

b) To provide educators with specific knowledge and skills which will facilitate the design and operation of school district based microcomputer programs.

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To determine the effectiveness of the course as to whether it is fulfilling its objectives and meeting the needs of the students an evaluation was needed. It was assumed that such an evaluation would not only enhance the quality of the course, but make it more relevant to future participants by revising and updating the content and methodology.

Objective: The purpose ot the study was to evaluate the microcomputer courses. The basis for evaluation was the participants evaluation of the following areas:

1. Computer literacy and skills.
2. Educational hardware and software evaluation.
3. Program development and writing.
4. Effectiveness of the course in teaching computer skills.
5. Structure and organization of course
6. Content of course
7. Relevance of course.

Method of date collection

The data were obtained via evaluation of the participants (teachers) in Microcomputer in Education (C&I 342) taught in the Department of Curriculum and Instruction. The sample includedeight microcomputer classes and 115 teachers taught during the 1983-1984 terms. The teachers were administered a post-test on computer literacy, hardware and software evaluation, program writing, and course evaluation.

The findings were analyzed in terms of the objectives. Statistical data and cross tabulations were obtained (CSU Co-op Computer Center and SPSS software was used).

Results

Analysis of the findings showed that the participants were generally satisfied with the effectiveness, organization, content and relevancy of the microcomputer courses. However, those participants who had future plans for using microcomputers appeared to be more satisfied with the courses than those who did not plan to use microcomputers in the future. The data were organized in terms of the areas--effectiveness, organization, content and relevancy according to future computer usage.

The responses to the effectiveness of the courses in teaching microcomputer skills are depicted in percentages in Table I.

TABLE I

EFFECTIVENESS IN TEACHING MICROCOMPUTER SKILLS

	N=80 *Future Plans			N=35 *No Future Plans			N=115 Total		
	Good	Average	Poor	Good	Average	Poor	Good	Average	Poor
A. Awareness	95	5		83	17		90	10	
B. Literacy	95	5		90	10		93	7	
C. Hands-On Experience	100			89	11		95	5	
D. Programming	52	48		61	33	6	56	41	3
E. Computer Application	86	14		61	39		74	26	
F. Hardware Evaluation	67	33		50	50		59	41	
G. Software Evaluation	71	29		61	39		67	33	

*To Use Computers

The findings in Table I show that the majority of students felt the effectiveness of teaching microcomputers was "good". Teachers with future plans to work with microcomputers gave a higher percentage of "good" responses than those with no future microcomputer plans.

Awareness (95%) literacy (95%) and hands-on experience (100%) received the highest percentage of "good" responses. On the other hand, programming received the lowest percentage (52-61%) of "good" responses. Awareness and literacy could be defined as the ability to define, demonstrate and discuss how computers are used, how they work, how to use them and their effect on society. (This definition could include programming proficiency.)

The student's relatively lower percentage of positive response to the effectiveness of teaching programming is probably influenced by the difficulty and complexity in learning basic programming. The process is time consuming and requires a great deal of experience to develop programming proficiency. A single three hour introductory course is not sufficient

to develop competency in programming.

Hardware evaluation also received a comparative lower percentage of "good" (67%) responses. This is probably the result of having to visit computer stores to evaluate computers. Apparently some of the store personnel were not always cooperative in explaining the various microcomputers to the students when they discover a sale was not involved. The students encountered similar resistance regarding the assignment to evaluate software (programs) for the computer.

The responses to the organization of the courses are displayed in Table II.

TABLE II

ORGANIZATIONAL EMPHASIS OF COURSE

	N=80 *Future Plans			N=35 *No Future Plans			N=115 Total		
	Too Much	Good	Too Little	Too Much	Good	Too Little	Too Much	Good	Too Little
A. History	5	95		17	83		10	90	
B. Theory	10	76	14	17	78	5	13	77	10
C. Computer Application	5	95		11	72	17	8	85	7
D. Hands-on Experience	19	72	5	6	89	5	13	82	5
E. Software Evaluation	5	76	19	6	78	11	5	77	18
F. Hardware Evaluation	5	86	9	6	83	11	5	85	10
G. Programming	10	71	19	17	78	5	13	74	13
H. Student Evaluation	9	86	5	11	89		10	87	3

*To Use Computers

Table II shows that the majority of students appeared to be satisfied with the organizational emphasis of the course. The data indicate that there is little significant difference in the responses of those with and without future plans to use microcomputers. The only exceptions were history, theory and programming in which teachers with no plans for using computers in the future felt there was an over emphasis in these three areas. On the other hand, teachers, who planned to use computers in the future, believed

there was too much emphasis (19%) on hands-on experience. The investigator is unable to explain these responses, although 72 percent felt the hands-on experience was "good" or just right. However, 19 percent of this group felt there was "too little" programming and software evaluation and 14 percent said there was "too little" theory. Of the total sample 18 percent wanted more software evaluation.

The responses to usefulness of course requirements are outlined in Table III.

TABLE III

COURSE REQUIREMENTS AND CONTENT

	N=80 *Future Plans			N=35 *No Future Plans			N=115 Total		
	Very Useful	Use-ful	Not Useful	Very Useful	Use-ful	Not Useful	Very Useful	Use-ful	Not Useful
A. Terminology	71	29		56	44		54	36	
B. Annotated Bibliography	43	57		55	39	6	48	48	4
C. Software Evaluation	52	48		44	50	6	48	48	4
D. Hardware Evaluation	57	33	10	44	50	6	51	41	8
E. Hands-On Experience	90	10		78	22		85	15	
F. Programming	57	43		39	56	5	49	49	3
G. Using/Review Software	52	48		61	39		56	44	
H. Educational Application	62	38		56	39	5	59	39	2
I. Computer Store Visitation	48	43	9	44	56		46	49	5

*To Use Computers

The majority of students felt the course requirements and content was "useful" to very useful". However, only the requirement of "hands-on experience" received the greatest percentage (85%) of "very useful" responses. The terminology requirement received 71 percent of 'very useful" responses from teachers with future plans for computer usage. A higher percentage of this group also felt that most of the requirements were "very useful" than those teachers who had no future plans to use microcomputers. The only

exception was the annotated bibliography requirement (43%). The total sample was divided on the "very usefulness" and "usefulness" of the annotated bibliography, software evaluation, programming, and computer store visitation. The latter requirement was found to be "very useful" by only 46 percent of the total sample. Ten percent of teachers who had future plans for computer usage and 8 percent of the total sample rejected hardware evaluation as being a useful requirement. This is probably influenced by their negative experience in some computer stores and their lack of fsmilarity with microcomputers in general.

The responses to the relevancy of the courses to participants' needs are shown in Table IV.

TABLE IV

RELEVANCY OF COURSE

	N=80 *Future Plans			N=35 *No Future Plans			N=115 Total		
	Very Much	Some What	No	Very Much	Some What	No	Very Much	Some What	No
A. Personal Needs	76	24		50	50		64	36	
B. Teaching Needs	57	43		39	44	17	49	44	7
C. Current Needs	71	24	5	39	61		56	41	3
D. Future Needs	67	33		33	67		51	49	

*To Use Computers

The data in Table IV illustrate that teachers who plan to use microcomputers in the future found the course most ("very much") relevant to their personal (76%) needs as compared to those with no plans to use microcomputer later on. Also the majority of the total sample felt the course "very much" met their personal (64%), current (56%), and future (51%) needs, but not their teaching (49%) needs. Five percent of teachers, who had future computer plans, believed the course was not relevant to their current needs.

In general, the majority of the participants felt the microcomputer course to be "very much" or "somewhat" relevant to their needs.

Conclusion

The results of the survey show that over 90 percent of the 115 participants were very satisfied or satisfied with the microcomputer course in

terms of effectiveness in teaching skills, organization emphasis, course requirements and relevancy of course. The reponses were significantly influenced by teachers' goals and responsibility to work with microcomputers in the future.

Their responses were further supported by their open-ended comments:

1) Class should meet more often.
2) Different type of computers should be available in class.
3) Students should develop beginning programs for their own work setting.
4) More programming.
5) More flowcharting.
6) Too much information in too short of time.
7) More hands-on experience.
8) Encounter difficulty in computer stores to show software.
9) Give more assignments—in class and homework.
10) Like the relaxed learning atmosphere.

Analysis of the finding indicate the following recommendations:

1) Instruction should be individualized as much as possible.
2) There should be a heavy emphasis on hands-on experience, programming and software review/evaluation.
3) Encourage students to do reading assignments.
4) Homework assignments:
   a) short reading assignments,
   b) assign 5-10 questions on homework,
   c) Give in-class worksheet with 5-10 questions to answered at end of class.
5) Set definite amount material or assignments to be covered during each class period.
6) Place more emphasis on in-class hardware evaluation through reading materials, lecture and demonstration with hardware.
7) Improve and supplement computer store visitations.
8) Improve relevance of course by relating content to individual experiences and needs of students.

The results of the study suggest that most teachers are not prepared to use computers independently after one microcomputer course, let alone to teach students with or about computers. Because classroom computers are still a relatively new phenomenons (although it is reported 53-55 percent of all schools in the United States has at least one microcomputer), some teachers are unsure of themselves working with microcomputers or even

feel threatened or intimidated by them. Also most teachers are not accustomed to working with technical equipment.

It has been reported by the Minnesota Educational Computing Consortium (MECC) that "without face to face instruction presented in a nonthreatening way most teachers would neither become nor remain computer users." Therefore a nonthreatening, relaxed environment must be an integral element in the teaching process because so few teachers have any background in computers. The investigator has noted that for those teachers who have had an introductory course in microcomputers, they still feeluncomfortable and tentative working with the machines. Most are dependent on the instructor for basic guidance in operation and simple programming.

There is some question as to the objective of microcomputer inservice programs and courses. Should the course focus on the microcomputer's relationship to instruction or on the computer as an object of study ? The data of this study together with the investigator's experience in teaching microcomputers to teachers suggest that teachers must obtain a certain level of hands-on computer familarity and competency before they can competently use the computer in their classroom. The computer has many classroom applications: assigning instructional units, monitoring individual student progress, diagnose learning problems, choosing corrective instructional units for individual students or groups and teaching students computer awareness and literacy. If teachers do not have a practical, competent working knowledge of the machine itself, they will be severely limited in applying computer instruction in the classroom.

It is recommended that the following elements should be included in microcomputer courses for teachers:

1) Activities to overcome negative attitudes or fears.
2) Definition of computer terms.
3) Familiarity and hands-on experience with major components of the several microcomputer systems.
4) Familiarity and hand-on use with the operations of several microcomputer systems.
5) Good foundation in basic programming.
6) Exposure to sources of information on microcomputers (books, journals, organizations and courses).
7) Critiquing software.
8) Critiquing hardware.

9) Computer store visitations.

10) Role of computers in education and society.

11) Classroom application of microcomputers.

12) Microcomputers and curriculum application.

13) Microcomputers data management.

14) The possible evolution of new roles for teachers and students.

15) Career preparation in computers.

The information explosion and ready access to the influence of computers in society pose many challenges to the traditional concepts of education. For teachers, it means they must be prepared to use the ready access to information and understand its application in the classroom. It means that educators must be open to the educative potential of microcomputers and the electronic age.